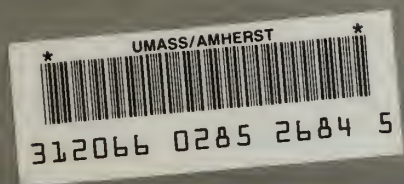


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Massachusetts Department of Public Works

GOVERNMENT DOCUMENTS
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Letter from the Commissioner

To the Residents of the Commonwealth

The past two years have been exciting ones for the Department. We have settled into our new downtown Boston headquarters, hired additional staff and implemented innovative ideas to fulfill our mission of providing a topnotch transportation network for the Commonwealth. I am pleased to serve as Public Works Commissioner and want to express my appreciation to Bob Tierney who guided the Department as Commissioner from 1983 through 1987. I have inherited from Bob the legacy of a Department committed to excellence and I am honored to have been selected to carry on our very important work.

This report, which covers 1986 and 1987, provides a description of our recent accomplishments and a synopsis of the diverse activities undertaken by more than 3,500 Department employees working throughout the state. Department construction projects range in size from small-scale safety improvements on Route 58 in Carver to the large and complex Central Artery/Third Harbor Tunnel project.

The Open Space Program allows us to purchase undeveloped land along state highways to preserve the natural beauty of the Commonwealth, while the Urban Systems Program seeks to bring revitalization to the business districts of some of our older cities and towns. The Small Town Road Assistance Program is designed to benefit our most lightly settled population centers, and the Public Works Economic Development Program is an innovative way to maintain the prosperity we have enjoyed over the past few years while also attracting new economic opportunity for more of our citizens. We have substantially reduced the application of de-icing chemicals on our roads and are experimenting with non-sodium materials to further protect our water resources. Our bridges are being repaired, rehabilitated and, in some cases, replaced. Planning teams are studying the viability of additional travel lanes to reduce congestion on Route 3 and Route 128. Planting wildflowers, cleaning up litter, removing snow, repairing guardrails and installing traffic signals are some of the tasks we perform to maintain a safe and attractive network of roadways.

We are grateful to Governor Michael S. Dukakis, Transportation Secretary Frederick P. Salvucci and the Legislature for their support which has allowed us to meet the transportation needs of our dynamic and growing Commonwealth.

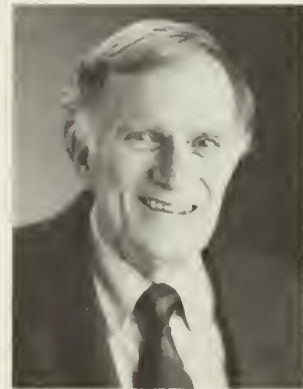
The 1986-87 Biennial Report is dedicated to the men and women of the Department of Public Works who carry out the transportation policy that supports the Commonwealth's economic vitality.



Jane F. Garvey
Commissioner



Jane F. Garvey



Robert T. Tierney

Introduction

The Massachusetts Department of Public Works is responsible for planning, designing, constructing and maintaining a safe and attractive network of approximately 3,000 miles of highway, 60,000 acres of highway roadside and nearly 2,800 bridges throughout the Commonwealth.

History

In 1893, the Massachusetts Legislature, recognizing the need for a well-maintained, comprehensive highway network to replace the existing pattern of rutted, often impassable dirt lanes, established the Massachusetts Highway Commission to develop the Commonwealth's roadways.

Comprised of three commissioners—an engineer, a geology professor and a representative from a coalition of bicyclists—the Massachusetts Highway Commission was the first organized state highway commission in America.

The first Federal Aid Road Act was passed by Congress in 1916. The Act determined that states had to have highway departments in order to receive federal funds. The Commission became the Massachusetts Department of Public Works in 1921 when the Legislature, in response to the Federal Aid Road Act, combined the Highway Commission with the Commission on Waterways and Public Lands. In 1967, the membership of the Public Works Commission, which is charged with the supervision of the MDPW, was increased to five, and in 1972, the Department became a part of the Transportation Secretariat.

The mission of the MDPW changed dramatically from the early years, when it was responsible for building a primitive roadway

network, to its present undertaking: the construction of the Commonwealth's modern highway system. In the 1940's and 1950's, national highways were high-priority items for the federal government. The Federal Highway Act of 1944 provided for an interstate system with routes determined by the states and approved by the federal government. Passage of the Federal Highway Act of 1956 enabled the federal government to provide 90 percent funding for the construction of interstate roadways. Originally intended to create a defense network to permit easy movement of supplies and troops across the country, this Act created a major highway construction boom in the 1950's and 1960's.

Today, the MDPW is rebuilding and modernizing our existing highways to accommodate the increasing volumes of traffic and to keep pace with our strong economic development.

The MDPW has formulated a Mission Statement that sets a course for the future:

- ☐ To support and promote the mobility of people and goods in Massachusetts through the sound development, efficient operation and proper maintenance of a safe, attractive highway system and formation of a coherent public transportation network through coordination with other transportation agencies.
- ☐ To administer highway capital programs to meet transportation goals which promote the Commonwealth's economic welfare and maximize the benefits to its physical and social environment.
- ☐ To assist local governments in improving their roads and highways in both urban and rural areas.



The New Transportation Building

Approximately one-third of the Department's 3,500 employees work in the state's new Transportation Building, located in Boston's Theater District. Designed as a model workplace, the building houses all of the Commonwealth's transportation agencies in an attractive and comfortable environment. The building offers a variety of services including health care, an excellent child care center and cafeteria.

The building's management team arranges an ongoing series of lunchtime programs for its tenants, and through an agreement with the Artists Foundation, has instituted an ambitious visual and performing arts program. The program includes lunchtime concerts and exhibits of paintings, photography and sculpture, which are regularly featured in the atrium lobby areas.



A Great Place to Work

The economic success of the Commonwealth during the last few years has resulted in an interesting problem for the MDPW and many other Bay State employers: how to recruit and retain skilled and experienced employees in a state with one of the lowest unemployment rates of any industrial state in America.

The MDPW's answer has been the implementation of innovative employment ideas and support programs. The Department has created a Human Resources department as part of our commitment to meeting the needs of staff and managers. Human Resources analyzes staffing requirements and projects manpower levels in order to produce an efficient mix of positions and skills. Incentive and recognition programs, coupled with career mobility, quality training and promotional opportunities are some of the benefits offered by the Department's expanded recruitment package. In addition, the new performance review programs for all state agencies provide managers and other employees with tools for planning and organizing their work, resulting in an even higher level of recognition and accountability.

Affirmative Action

The MDPW is committed to providing opportunity to everyone. The Department has instituted an aggressive Affirmative Action program in the hiring and recruiting of minorities, women, Vietnam-era veterans and physically challenged persons as well as in the contracting of goods and services with women-owned and minority-owned businesses.

An analysis of the Department's current workforce shows a 50 percent increase in the number of minorities employed during the past three years. The number of veterans and non-clerical women working in the Department has also increased dramatically. In the past two years, the Department exceeded all its goals for awarding contracts to minority-owned businesses for goods (a goal of 5 percent), services (5 percent) and construction (11 percent).

Comprehensive Education and Training Program (CETP)

During the past two years, over 2,000 employees have attended courses in nearly 80 subject areas as varied as word processing, hot mix asphalt paving, management techniques and bridge carpentry. They have done so through the Department's Comprehensive Education and Training Program (CETP). Administered by the University of Massachusetts Institute for Governmental Services, CETP provides MDPW employees with the opportunity to attend state community colleges, free of charge, to pursue an associate's degree in Civil Engineering Technology or Business.

Bachelor's and master's degrees in work-related fields from state and local educational institutions are made possible through the Department's tuition reimbursement program. Nearly 40 MDPW employees have received degrees since the program was initiated. In addition to degree-oriented opportunities, CETP allows employees to enroll in special job-related courses, offers in-service training and provides managers with the ability to use training as a tool for organizational improvement.





Mei Ling Nguy
Principal Clerk

"My daughters are right down the hall from me in the Transportation Children's Center. They come into work with me in the morning and we leave together in the afternoon. Sometimes we have lunch together. Knowing that my children are getting excellent care is one of the best parts of my job."

The state and federal governments support the activities of the MDPW. Each year the Legislature appropriates money for all operating costs, such as maintenance and personnel. Approximately every two years, the Legislature also approves a Transportation Bond Issue to fund capital projects for work on both highways and local roadways.

Federal funds pay a portion of project-related expenditures. These include salaries paid to employees working on capital projects, the costs of landtaking and the accompanying relocation of people and businesses; the cost of project field offices; engineering and consultant costs; and actual construction costs for projects on the Federal Aid System.

Chapter 90

Chapter 90 bond funds are made available to the communities by Transportation Bond Issues and are used for the construction and reconstruction of town and county roadways and bridges. Chapter 90 funds are distributed based on a formula that takes into account the community's road miles, employment and population. The \$60 million appropriated in the 1985 Transportation Bond Issue represented a \$20 million increase over 1983. The 1988 Bond Issue proposes \$80 million in Chapter 90 funds.

Public Works Economic Development (PWED) Program

Designed to fund transportation-related improvements that will encourage economic development, the Public Works Economic

Development (PWED) program has generated more than \$350 million in jobs and investment since its inception. Between 1983 and 1986, four rounds of awards, totaling approximately \$73 million, have funded 197 projects in 140 communities.

In 1987, the success story continued with the awarding of a fifth round of PWED funds totaling \$10 million. The grants, managed by the MDPW, reflect the Commonwealth's dedication to expanding the tax base of communities and increasing private investment. A long list of beneficiaries demonstrates the widespread success of the PWED program. From Provincetown to Pittsfield, the investment boom is receiving a big helping hand from the success of the projects made possible by PWED grants.

Small Town Road Assistance Program (STRAP)

The Small Town Road Assistance Program (STRAP) is a competitive grant program which enables towns with populations of less than 2,000 to apply for grants to cover capital costs for local road projects. The 1985 Transportation Bond Issue authorized \$5 million for the program, more than doubling the amount made available in 1983, when the program began.

From West Tisbury to Florida, 52 communities statewide have taken advantage of \$7 million in funds made available to them during the last three years. Projects are individually assessed for STRAP awards, ranging in cost from \$50,000 to \$150,000. Of the 57 towns identified as eligible in 1985 to apply for grants, 37 were awarded grants to fund projects designed to create safer driving conditions and boost local businesses. Towns may receive one grant and are required to repay 30 percent of the money received over a 10-year period.

Construction Projects Advertised
(in millions)





Operating Budgets

	1986	1987
Personal Services (salaries)	\$ 82,200,000	\$ 84,100,000
Traffic Congestion Program	20,000	183,721
Admin. and Engineering Equipment	100,000	112,722
Admin. Engineering Expenses	6,325,000	6,438,227
Outdoor Advertising Board	106,052	112,722
Snow and Ice Control	14,219,426	20,500,000
Traffic Line Painting	1,057,652	1,057,652
Materials and Supplies	2,122,875	2,122,875
Fleet Management	3,577,376	3,080,683
Maintenance/Operation of Highways and Bridges	6,010,851	6,075,000
State Aid (Fringe MBTA Communities)	2,500,000	2,500,000
State Aid (Non-MBTA Communities)	18,469,803	18,469,803
Distribution of 1/2¢ Gas Tax	18,300,000	19,650,000
Expenses for Painting and Repairing State Bridges	5,500,000	5,500,000

See page 20 for Transportation Bond Funds

Access to State-Owned Lands

The 1985 Transportation Bond Issue authorized \$1 million to be made available to communities in grants of up to \$200,000 to improve highways and bridges that provide access to state-owned lands such as parks, prisons and hospitals. The eight communities

benefiting from the program were Brimfield, Carver, Florida, Hadley, Monson, Orange, Princeton and Westminster. All eight plan to utilize the money, which was distributed in 1987, to upgrade state park access. The proposed 1988 Bond Issue authorizes \$3 million for the program.

Districts

The lion's share of the credit for construction and maintenance of one of the best transportation systems in the country belongs to the people who work in each of the Department's eight engineering District Offices. The leadership provided by each of the eight District Highway Engineers, from rural District 1 in the Berkshires to the urban, Boston-based District 8, was responsible for the advertising of \$511 million in new construction projects in 1986 and 1987. Working with designers and planners in Boston, District personnel are on the front

lines in providing for the transportation needs of the Commonwealth's burgeoning economy.

District Liaisons

In 1986, four District Liaison Coordinators were hired to provide a vital link between the Department and the communities served by the District Offices. Assigned to the four busiest Districts, the Liaisons keep residents, local legislators and the media informed regarding MDPW projects and provide a mechanism for increased community participation in projects.



■ STRAP Grants
□ PWED Grants

District 1

Nestled in the western part of the state, District 1 is home to some of the smallest towns and most rural roadways in the Commonwealth. A large amount of the District's time, energy and funds is spent every winter keeping roads and bridges free of snow and ice to assure safe driving. During 1986 and 1987, 15 town bridges were replaced or rehabilitated. Work began on the \$3.8 million Dan Fox Highway (Pittsfield Airport Connector). The Environmental Impact Statement for the remainder of the Pittsfield Bypass neared completion. The \$3.9 million pavement recycling project on Routes 8 and 9 in Dalton was completed, and the \$2.5 million relocation of Middlefield Road in Chester, including the replacement of two bridges, got underway.

District 2

The District 2 Office oversees the building and maintenance of state highways and bridges in the Connecticut River Valley and a good portion of the Berkshires. Along with assuring easy access to some of the Commonwealth's most beautiful vacation spots, the District is dedicated to revitalizing the downtown areas of many of the state's oldest industrial cities. In downtown Springfield, the \$4.6 million North Blocks project got underway and the work, which includes sidewalks, benches, lighting and park spaces in addition to new roadways, has already stimulated private investment in the city's economy. The \$3.75 million King Street project in Northampton, featuring new utilities and the upgrading of an outmoded signal system, is expected to revitalize a major commercial area in the town. In addition, Public Works Economic Development projects are underway at 20 locations while 21 towns are benefiting from the Small Town Road Assistance Program.

District 3

Over the past few years, MDPW roadway improvements in Worcester County have provided incentives for industrial redevelopment in the Blackstone Valley region and North Central Massachusetts. With the Commonwealth's second largest city, Worcester, as its center, District 3 directs highway construction in urban areas with high traffic volumes and in near-rural communities that are taking advantage of increased Chapter 90 funding. Over the two-year period, the \$50 million project to construct Route 146 from Sutton to the Rhode Island border and a section of Route 2 in the Westminster/Fitchburg area were completed. The Route 2/Mt. Elam Road project and the proposed direct connection from Worcester to the Massachusetts Turnpike (I-90) both entered the environmental stage.

District 4

District 4 covers all of Middlesex County, the most thickly settled in the Commonwealth. While most of the high-volume major connectors to Boston pass through the county, District 4 also has some of the smallest towns in the Commonwealth and thus deals with the full range of problems and road conditions: congestion and signal coordination in such urban communities as Framingham, Lowell and Newton and the maintenance of lightly-traveled lanes in towns as small as Ashby. District projects begun during the past two years include the reconstruction of over a mile of the Middlesex Turnpike; the \$6 million Sampson Connector project, designed to relieve traffic congestion generated by Lowell's economic revitalization; and the widening of Route 30 in Framingham. In addition to these major projects, the Route 93 bridge deck replacement over Route 95/128, five bridge replacement projects and eleven safety upgrading projects are satisfying the transportation needs of the communities served by the district.

District 5

Names such as Salem, Gloucester, Marblehead . . . and Essex evoke images of classic New England. District 5 with its coastline, historic cities and towns, fishing industry and burgeoning economy is a great place to live and one of the most interesting places in the Commonwealth for visitors. Much of the area's economic success story was written as a result of enormous improvements to the highway network and private investment in local economic development. District 5's projects include a massive new \$38 million interchange between I-95 and Route 128 which is nearly completed. A new \$2.3 million overpass will soon give shoppers direct access into Methuen Mall from Route 213. In addition, the \$3.5 million widening of approximately 2.5 miles of Route 114 and installation of traffic signals at four locations is allowing safer passage into many businesses in the Peabody/Danvers area.

District 6

The largest of the eight offices, District 6 has more lane miles of highway, more operating drawbridges and some of the largest traffic volumes in the Commonwealth. With many of its communities located on the coast or along rivers, much of the District's effort is geared to keeping hundreds of bridges in working order. These include the Braga, Brightman Street, New Bedford-Fairhaven and Fore River bridges as well as bridges over expressways and rail-road tracks. Many of the structures, including the drawbridges, date from the early part of this century. The District's largest project, the \$37 million reconstruction of the 1.3 mile Charles Braga Jr. Memorial Bridge got underway in 1987. In other activity, District Maintenance crews participated in a successful experiment utilizing CMA (Calcium Magnesium Acetate), a non-sodium de-icing

compound, on a section of Route 138, and the Braintree Five-Corner improvement project was advertised after years of planning and design work.

District 7

District 7 covers the southeast corner of Massachusetts including Cape Cod and the Islands. Because of the District's coastal geography and Cape Cod's geologically critical sole-source aquifer, many environmental issues are often intertwined with road improvement projects. Major construction projects such as the Route 25 extension, have resulted in innovative methods for dealing with water runoff during the winter months. District 7's commitment to protecting the Cape's drinking water and shellfish industry has been further demonstrated by a policy which reduced road salt applications by 65 percent and experimentation with the non-sodium compound, Calcium Magnesium Acetate (CMA). The top priority project has been the Route 25 Extension, completed in the fall of 1987. Other projects well on the way toward improving safety and increasing capacity are the Route 44 relocation in Plymouth and Carver and the upgrading of Route 6 between Dennis and Orleans.

District 8

Maintaining and building roads and bridges in the very heart of one of the country's busiest urban settings presents a formidable challenge to the District responsible for Boston and 15 adjacent communities. This challenge is often met in a unique way or, more accurately, at a unique time. Whenever possible, routine maintenance and repairs are scheduled at night to minimize traffic disruption. With increasing traffic volumes extending commuting hours and thus narrowing time periods available to rebuild, replace or make necessary repairs, night work on the infrastructure is the wave of the future in urban highway settings. And it's already working in District 8. In Boston alone, work got underway on Huntington Avenue in the hospital district, the Columbus Avenue and Tremont Street project was completed and the \$10 million project to computerize traffic signals in Boston and Brookline continued to move ahead. The relocation of Nashua Street to make room for the new Suffolk County Jail was begun. Work is underway on several railroad bridges, and summer clean-up crews are hired annually to help with the enormous task of keeping the highways around America's most beautiful city free from litter.

Dick Barber
Assistant District Construction Engineer

"Every day, a variety of issues brings me into contact with municipal officials, contractors, the general public and an occasional politician. The people who work in the department are helpful to everyone. They enjoy their work and take pride in seeing that jobs are done properly. But more than that, the DPW's district employees are really a part of the community that we serve."



Before a new highway or bridge improvement project can be designed or implemented, it is necessary to collect and interpret a wide variety of data pertaining to the current use and future demand for the facility. This data assists decision-makers in making infrastructure investment decisions. The MDPW's Bureau of Transportation Planning and Development (BTP&D) serves to collect, analyze and furnish data pertaining to roadway extent, condition, performance and operation in order to support engineering activities and decision-making throughout the Department.

Traffic Data Collection

BTP&D conducts an ongoing traffic counting program, which collects and analyzes existing data on traffic flow, vehicle classification (car-truck composition), and turning movement in order to develop forecasts of traffic volumes 20 years into the future. Such data may be used for a variety of purposes, including environmental impact assessment, highway design, traffic signal timing and the calculation of the thickness of pavement needed.

In addition to data collected for specific improvement projects, BTP&D collects traffic volume data at carefully selected sampling sites, which can be used to determine annual changes in regional and statewide patterns of traffic volume. This data is combined with other roadway performance and condition data into FHWA's Highway Performance Monitoring System. The data is merged with similar files from other states to form the basis

of FHWA's report to Congress on the status of the nation's highways, with recommendations for highway funding programs. Thus, the data also assures the uninterrupted flow of federal funds into the Commonwealth.

Environmental

The Environmental Section ensures that all MDPW projects meet the requirements of applicable federal, state and local environmental laws and regulations. Its main function is the preparation and review of various environmental documents ranging from simple Environmental Notification Forms for minor projects to Environmental Impact Statements for major ones. Major projects with EIS's currently under review include Route 2/Alewife Brook Parkway; the Route 128 and Route 3 north and south Add-a-Lane projects and the replacement of the Brightman Street Bridge in Fall River and Somerset. The section also reviews Environmental Impact Reports on private development projects to determine their impact on roadways under the jurisdiction of the Department.

Special programs underway include establishing a priority list of interstate noise barrier locations, a survey of historic bridges, the protection and replication of wetlands along state roads and a study of the snow and ice control program.





Pavement Management

Massachusetts is among the national leaders in the implementation of a Pavement Management System. This fact reflects the MDPW's commitment to provide the best possible travel surfaces by means of the most advanced technology. For the past year, the Department has formulated a plan for predicting pavement deterioration rates. By bringing together elements of design, planning, construction, maintenance and research, we establish the life expectancy of roadway surfaces and thereby assure an efficient allocation of funding for resurfacing and reconstruction work.

Accessibility

In the spring of 1987, MDPW designers and engineers attended seminars to increase awareness of the obstacles faced by disabled people in an environment full of architectural and attitudinal barriers. The seminars focused on the close relationship between design requirements for accessibility and how environmental barriers constitute serious threats to the mobility and freedom of the visually impaired, those who use wheelchairs or are in other ways physically challenged.

As a result of the seminars, the Department is working with the Office of Handicapped Affairs to address issues of accessibility. Field trips are scheduled to review construction projects, and recommendations for variances are pursued with the Architectural Access Board, when necessary. A video entitled "What Is Mobility without Accessibility?" starring MDPW personnel, was produced for the seminars and is being shared with other states promoting accessibility awareness.

Regional Planning and the "3C" Process

The BTP&D also coordinates an intensive public participatory process, through 13 Regional Planning Agencies (RPA's). Each of the Commonwealth's 351 communities has an opportunity to participate in the process which seeks to identify and communicate both long- and short-range multi-modal transportation needs. Guided by the federally mandated "3C" (Comprehensive, Cooperative and Continuing) Transportation Planning Process guidelines, the RPA's identify long-range comprehensive regional transportation needs in a Transportation Plan, and shorter range regional multi-modal needs in Transportation Improvement Programs (TIP's). Both of these planning documents are necessary for the receipt of federal highway and transit funding. The planning process determines current transportation situations, projects future needs, interprets how those needs can be met and puts together basic design concepts. The RPA's also provide communities with such technical services as intersection and traffic signal analyses, accident studies, traffic volume counting and pavement management studies.

Park and Ride Lots

Park and Ride lots are developed along major corridors to give commuters the opportunity to share rides to work. Most lots are serviced by private bus carriers, although some have been built to accommodate carpools or vanpools. One lot provides parking for commuter boat users. Thirty-seven MDPW Park and Ride lots provide 3,788 spaces. In 1986-87, three lots with 398 spaces (Newburyport, New Bedford and Somerset) were added. Lots in Groveland, Methuen and Chelsea are under consideration and could provide 1,000 additional spaces.

The Highway Engineering Division oversees and designs transportation systems as diverse as bikepaths, carpool lanes, bridges and highways. With change in the Department's focus, from the construction of major roadways to the maintenance of existing structures, the work has become as complex as it is varied. Highway and bridge work must balance the need for traffic movement and local access while properly addressing environmental and historic concerns.

effectively with the increase in the number of in-house designs and to provide design engineers with more comprehensive supervision. At any given time, the section has approximately 40 active bridge projects underway, ranging from major structure replacement to deck repair. The Department's Bridge Design Engineers oversee designs submitted by municipalities, respond to such emergencies as bridges damaged by vehicles, determine the structural adequacy of bridges in order to

Highway Engineering and Right-of-Way Bureau

In order to accommodate the change in focus, the Department recently determined that in-house bridge and highway design teams should be re-established. Having in-house capacity is expected to improve quality, cut costs, speed up the design process and provide flexibility for design changes. Supported by funds earmarked for that purpose in the 1983 and 1985 Transportation Bond Issues, the division began rebuilding essential staff that had been decimated by budget cuts in the early 1980's. The first group of new Junior Civil Engineers was hired in 1985. Mid-level engineering positions were added in 1986 when the current staffing level was brought to 220. By 1991, it is expected that the staffing level will reach 279. While most of the new engineering staff was assigned to highway and bridge design work, additions were also made to such support components as geotechnical, specifications, hydraulics and environmental. These units provide technical information to other departments within the MDPW.

The bridge design staff was reorganized in 1987 into seven teams in order to deal more

issue permits for installation of sewer and water mains and determine bridge carrying capacities.

Right-of-Way Bureau

The Department's own real estate agents, housed in the Right-of-Way Bureau, acquire land and buildings necessary for highway construction and maintenance projects. When a project is still in design, ROW professionals undertake a range of legal and administrative activities to identify, appraise and negotiate for necessary property and to relocate businesses and households.

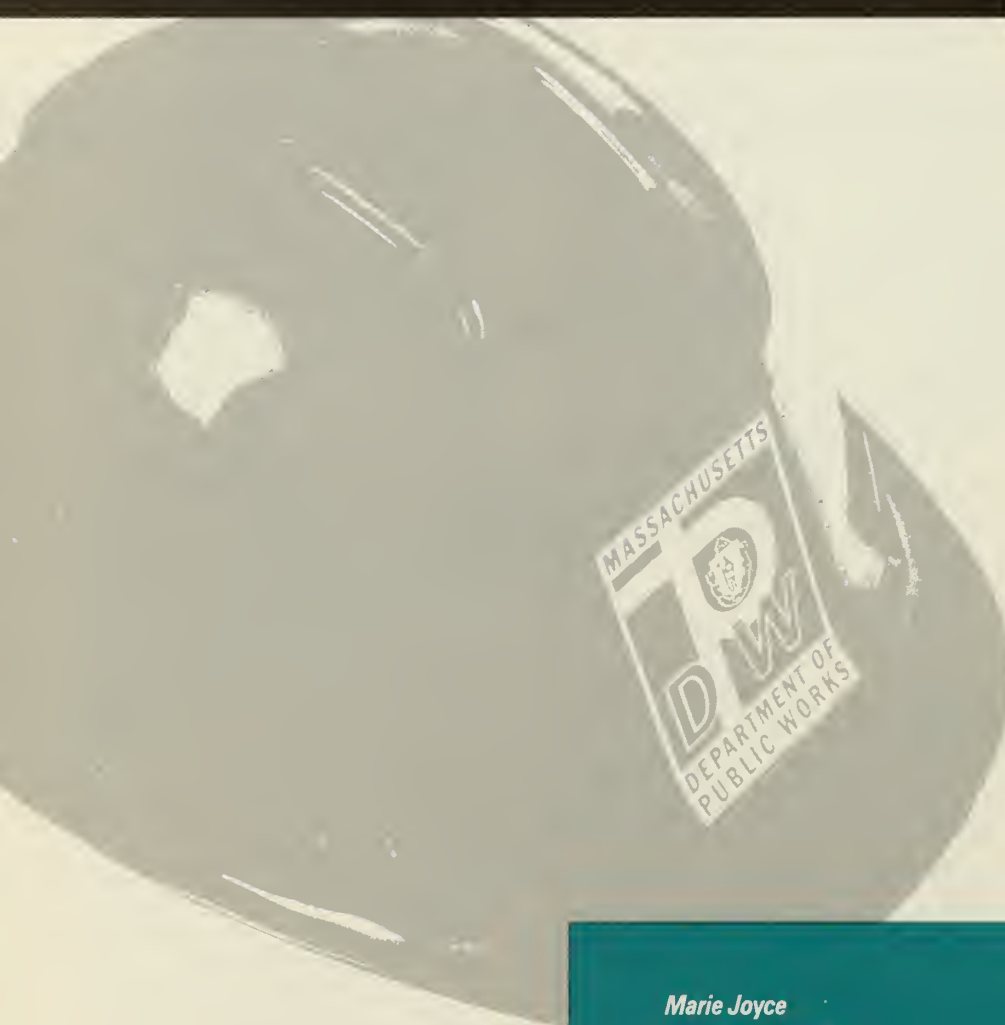
In 1986, 1158 parcels were acquired for \$6,261,640 which allowed the construction of such important projects as Route 2 in Fitchburg, the Sampson Connector in Lowell and the Airport Connector Road in Pittsfield. During 1987, the Department acquired 893 parcels of land at a cost of \$10,517,260. This amount included \$2.5 million for the acquisition of a site that lies in the path of the new third harbor tunnel and nearly a million dollars for the preservation of open space.





Maaza Mekuria
Senior Highway Designer

"In my two years with the Department, I've sharpened my professional skills, adapted to working with people of different cultures and made a lot of good friends. The educational opportunities offered here have enabled me to pursue a graduate degree in engineering."



Construction

The dollar amount of construction projects advertised each year by the MDPW is an important measure of the Department's success. The Construction Division, supported by the eight District Offices located across the Commonwealth, administers the Department's construction program and holds the key to moving projects from the advertising stage through their completion. The effort required in overseeing between \$200 and \$300 million annually in highway and bridge construction is complex and time-consuming. From the opening of the advertising bids until the completed work is accepted and turned over to the maintenance division or local community for upkeep, a wide variety of issues must be addressed: Contracts must be monitored to assure that equal employment opportunities are offered to minority- and women-owned businesses. The environment must be protected from activities ranging from the sandblasting of bridge structures to possible noise from construction equipment. The Resident Engineer on a project must remain sensitive to the concerns of residents and businesses adjacent to construction sites and provide them with continuous access whenever possible. The work of contractors must be monitored to assure that the project is built to appropriate specifications. The in-house analysis capabilities of the Wellesley Research and Materials Laboratory must be utilized continually to assure high-quality construction materials.

Marie Joyce
Resident Engineer

"Working in the field has given me a better understanding of how a job proceeds from design to construction. It was a challenge to serve as Resident Engineer on the Burrill Avenue project in Bridgewater and very satisfying when the job was completed on schedule and I saw how pleased the community was with the work."

With the high volumes of traffic on Commonwealth roadways, the Construction Unit is continually challenged by the need to make bridge and highway repairs while maintaining relatively normal traffic flows. It is no longer possible to close down such facilities as Boston's Southeast Expressway or Fall River's Charles Braga Jr. Memorial Bridge for reconstruction purposes. Innovative traffic management techniques are now an integral part of the entire effort.

Beauty and Technology

The Commonwealth's proud history of bridges includes beautiful wooden covered structures—such as the one recently rehabilitated on the Ware-Hardwick line—and such feats of technology as the 1.3 mile Braga Bridge in Fall River. To celebrate the importance of our bridges and to provide an opportunity for outstanding bridge engineers from around the country to share their insights and experience with in-house designers and local consultants, a conference on bridge design was sponsored in Boston in 1986. A major highlight of the conference was the exhibition of award-winning bridge designs from California as well as the popular designs of noted Swiss engineer Christien Menn. The conference also produced a remarkable joint venture between the MDPW and the Massachusetts Council on the Arts and Humanities, a book entitled Bridge Design—Aesthetics and Developing Technologies.

Bridges

The MDPW regularly inspects and rates 4,400 bridges in the Commonwealth, and is directly responsible for the 2,800 bridges on state and interstate highways, including the 600 bridges that span railroad rights-of-way on local roads.

The Department funds the construction and reconstruction of state and local highway bridges from state and, when applicable, federal funds.

The Non-Federal Aid Substandard Bridge Program funds projects to improve or reconstruct state and local bridges that have been found to be substandard by the MDPW. Bridges qualifying for program funds have poor safety ratings and are not eligible for federal funds. Reimbursement for bridge work is available to communities for costs of actual construction and right-of-way takings on local roads.

The bridge maintenance section maintains all state bridges and also provides minor construction services, or betterments, in order to keep bridges in service until they can either be rehabilitated or replaced.

In 1986, 113 bridges were rehabilitated or replaced at a cost of \$94 million. In 1987, 93 bridges were rehabilitated or replaced at a cost of \$84 million.



Archaeology in Charlestown

Recent archaeological excavations in Charlestown have yielded materials which provide information on 17th- and 18th-century life in one of the earliest settlements in America. Recovery of pieces of glass, potshards, bones, silverware and other articles as well as the uncovering of house foundations, privies, wells and wharf structures has contributed to our understanding of the development of Charlestown from a small outpost to a major commercial port of regional and global significance. Excavations at a distillery, the Great House/Three Crane Tavern site, several pottery manufacturing sites and a wharf site have provided an opportunity to examine a cross-section of the community's social and economic development. The Great House is reputed to have been the residence of John Winthrop, the first Governor of the Massachusetts Bay Colony. The building, which later became the Three Crane Tavern, may have served as a shelter for underground activities prior to the Revolution. Excavations at the wharf and pottery sites have allowed us to examine such commercial activities as manufacturing techniques, pottery production technology and the competition of domestic wares in local, regional and global markets. Additionally, the commercial make-up and changing patterns of the land use along Charlestown's waterfront were also uncovered. During the excavations of one pottery site, archaeologists recovered stone tools used by Native Americans 6,000 years ago.

The fieldwork has been completed and a final report describing the results of documentary research and fieldwork will be forthcoming in the fall of 1988.





Central Artery North Area Project

Construction on the largest road building project in MDPW history started in May 1987 when work began on the Central Artery North Area (CANA) project in Charlestown. The reconstruction and depression of the interchange of Route 1 and Interstate 93 will eliminate a dangerous chokepoint in the interstate highway system while revitalizing the historic City Square area.

CANA, separately funded but coordinated with the Central Artery/Third Harbor Tunnel project, is well underway, with a temporary detour structure open to traffic. The detour will allow motorists to travel to and from the Tobin Memorial Bridge and the Central Artery until the new interchange is open to traffic in the early 1990's. A vigorous community outreach and participation program, in addition to an aggressive traffic mitigation plan, is underway to ensure public safety with a minimum of inconvenience to commuters.

When the project is completed:

- ☐ The merge distance where I-93, Route 1, Storrow Drive and the Central Artery cross the Charles River will be lengthened from 600 to 2,000 feet eliminating the region's most serious bottleneck.
- ☐ The "S" curve approach to the Tobin Memorial Bridge from the Central Artery will be eliminated.
- ☐ All traffic to and from the Tobin Memorial Bridge will travel through tunnels constructed under City Square.

- ☐ The accessibility of the expressway from City Square will be enhanced and the local street system improved.

- ☐ The overhead ramps that shadow Charlestown's City Square today will be demolished, creating open space for parks and future development.

Central Artery/Third Harbor Tunnel

On April 3, 1987, the United States Senate voted to override the President's veto of the Surface Transportation Act enabling the Central Artery/Third Harbor Tunnel (CA/THT) project to become eligible for 90 percent federal reimbursement.

The project will benefit thousands of New England motorists who travel each day through the most congested stretch of interstate highway in the country: Boston's I-93 Central Artery. This bottleneck threatens to cripple the regional economy and further disrupt life for travelers.

The Federal Highway Administration approved a plan to address these problems, it consists of three major components:

- ☐ The replacement of the six-lane elevated section of the I-93 Central Artery with a new 8- to 10-lane road, mostly underground, between the Southeast Expressway and Charlestown.
- ☐ A new two-mile seaport access road which will link the artery and tunnel and accommodate the growing volume of truck and other traffic bound for rapidly developing commercial sections of South Boston.
- ☐ A four-lane third harbor tunnel which will provide direct access to Logan Airport from the south and west. The tunnel has been designed to surface on airport property, avoiding East Boston residential areas.

Combined, these three major undertakings will reshape Boston's interstate highway system, facilitate transportation flow in the city and throughout the region and reconnect the city with its historically significant North End.

Jim Norcott
Snow and Ice Engineer

"The Department's policy of pairing young engineers with old-timers like me is the best way of passing on skills and bringing new employees into the ranks of the experienced as quickly as possible. These young folks are bright, enthusiastic and fun to work with. They're the future of the Department and we have a great deal to learn from each other."

Maintenance Division

The MDPW's Highway Maintenance Division has the challenging responsibility of resurfacing highways, inspecting, maintaining and repairing some of the nation's oldest bridges, controlling snow and ice, as well as planting annuals, perennials, wildflowers and shrubs in an effort to maintain a safe and beautiful state highway system. Maintenance personnel fill potholes, clean catch basins, repair highway guardrails, and keep rest areas clean and well-groomed for travelers. During the last two years, the Highway Maintenance Division was responsible for maintaining and repairing 15,512 lane-miles of highway, 211 roadside rest areas, 3,400 bridges, 6,500 highway lights, 40,000 highway signs, 740 traffic signals and 31,000 catch basins. Maintenance personnel also removed 24,074 cubic yards of litter and trash from state highways.

Roadside Beautification

In its effort to improve the appearance of the state's transportation network, the MDPW's Maintenance Division expanded its wildflower planting program in 1986 to include a new seed mixture featuring varied colors and bloom times. Public support has grown for the landscapes created by the sowing of acres of wildflower seeds, the planting of thousands of saplings and hundreds of shrubs, and the artful plantings of annual flowers which grace the state's highways. In addition to their aesthetic appeal, the acres sown with wildflowers need only one mowing a season, thus providing the Commonwealth with an additional financial benefit.

Salt Reduction

Safeguarding Massachusetts' unique environment has prompted the MDPW's Maintenance Division to initiate an extensive program designed to cut down on the amount of road salt applied to state highways.

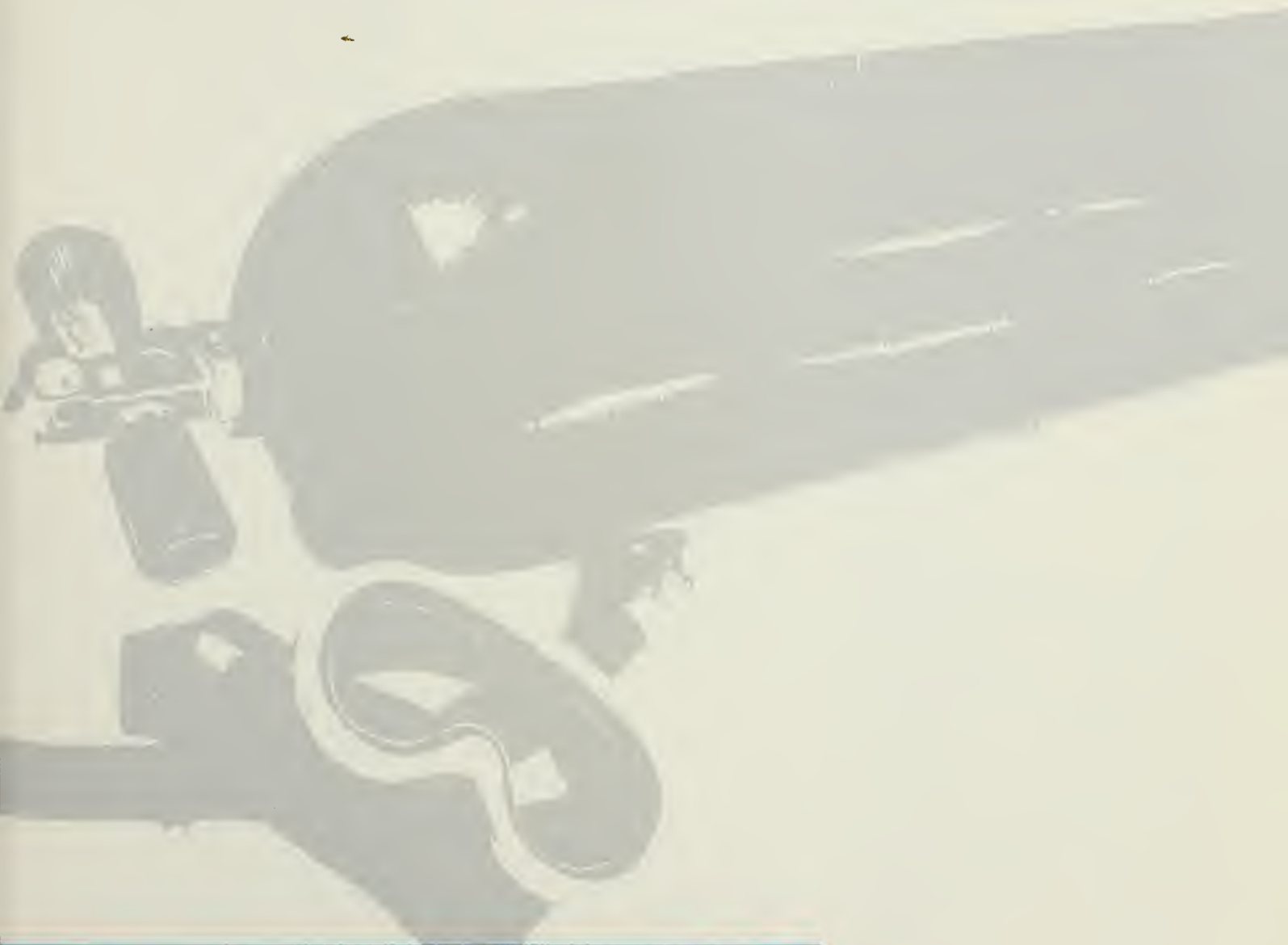
During the winter of 1986-87, Highway Maintenance personnel reduced salt applied to Cape Cod roads and those adjacent to municipal water supplies across the Commonwealth. In addition, selected low traffic volume state highways were targeted for reduced salt applications.

The Department has also begun exploring the benefits of alternative de-icing agents in treating roadways during snow and ice conditions. Successful preliminary results obtained from application of the chemical compound CMA (Calcium Magnesium Acetate) to a section of Route 138 in Somerset has provided the Department with evidence that the use of this and other salt alternatives may soon be expanded.

Underwater Bridge Inspectors

Since 1973, the Department's Underwater Operations Team, under the direction of the Maintenance Division, has performed regularly scheduled inspections of more than 700 bridges over water which is three feet or more in depth. In the aftermath of the statewide spring flooding in 1987, team members were challenged by conditions which included strong currents, poor visibility and debris-laden waters; they still managed to conduct 320 inspections during April and May alone. So effective and timely was the team's work that crews were able to respond to numerous requests for assistance from various cities and towns. The two dozen engineers who divide their time between diving and regular duties provide fast, reliable inspection information in one of the Department's most critical areas.





Skip McCourt
Senior Civil Engineer
Underwater Bridge Inspection Team

"There's a real camaraderie among the divers on the team. The work I perform in addition to my regular duties gives me a chance to expand the traditional role of an engineer. This kind of hands-on experience, which is typically unavailable, is terrific."

Transportation Bond Funds

Category	1985			1988		
	Federal	State	Total	Federal	State	Total
Federal and highway construction interstate	270.00	30.00	300.00	734.00	81.50	815.50
Federal aid highway construction, other than interstate	405.00	135.00	540.00	322.00	107.50	430.00
Engineering Services/DPW Personnel	30.00	30.00	60.00	35.00	35.00	70.00
Planning & Research	6.00	6.00	12.00	7.50	7.50	15.00
Certain Expenses		1.00	1.00		10.00	10.00
Improvements to DPW Maintenance sites		1.00	1.00		1.00	1.00
Salt Sheds		2.00	2.00		6.00	6.00
Bridges-non-federal aid		25.00	25.00		29.00	29.00
Highways-non-federal aid		100.00	100.00		125.00	125.00
PWED		25.00	25.00		30.00	30.00
Open Space		10.00	10.00		7.50	7.50
Betterment Projects					10.00	10.00
Highway Aid to cities & towns		60.00	60.00		80.00	80.00
Bike Paths		3.00	3.00		4.00	4.00
Commuter Boats		1.00	1.00			
Salt Contamination		1.00	1.00		1.00	1.00
STRAP		5.00	5.00		5.00	5.00
DPW Garages		6.00	6.00		5.00	5.00
District 7 Office		5.00	5.00		1.00	1.00
DPW Highway Maintenance Fleet Equipment		10.00	10.00		16.00	16.00
Access to State Land		1.00	1.00		3.00	3.00
DPW Hazardous Waste					2.00	2.00
Fuel Tank Replacements					1.00	1.00
Alternate Transportation/CANA					5.00	5.00
Traffic Lights					.60	.60
Water Drainage, Sewer-impacted by/on state highways					20.00	20.00
Water Transportation/Traffic Mitigation					5.00	5.00
Water Drainage, Sewer Impacted, along state highways					5.00	5.00
Potential Reimbursement		5.00	5.00			
MDC		33.00	33.00		41.38	41.38
Totals	711.00	495.00	1206.00	1098.50	644.98	1743.98
DPW Totals	711.00	462.00	1173.00			

Open Space Program

The traditional New England landscape with views to the sea, acres of wildflowers and sweeping rural vistas will continue to bring pleasure to Massachusetts residents and visitors, thanks to the Department's Open Space Program. Initially funded with \$10 million in the 1985 Transportation Bond Issue, the program has already preserved from development a large tract of land in North Truro on Cape Cod, and has identified a number of parcels, including several locations along Route 128, establishing a "green corridor" between Beverly and Gloucester. Other locations are on the Back River in Hingham and a section of the largest undeveloped tract of land in Barnstable, adjacent to Route 6.

Working jointly with state environmental agencies and nonprofit groups to acquire parcels and ensure their maintenance and management, the program focuses on the preservation of scenically distinctive parcels located along public ways and in environmentally sensitive areas.



Mary Cofelice
Metals Control Engineer

"The problem-solving aspect of my job gives me the most satisfaction. When fabricating shops or the project crews can't make the structural steel fit, we work with them to find the best solution. In my three years with the Department, I've found that the individual—not the system—determines the quality of materials. When people care, the product is better."

Organizational Chart

Commissioner

Jane F. Garvey

Associate Commissioners

Ellen M. DiGeronimo

Esther H. Francis

Kenneth E. Kruckemeyer

George R. Turner, Jr.

Chief Engineer

Robert H. Johnson

Director of the Bureau of Transportation

Planning and Development

Michael D. Meyer

Director of Right-of-Way Bureau

Joseph A. Fanale

Director of Administrative Services

Kathleen M. Sullivan

Director of the Capital Expenditures Program

Office

George M. Joseph

Public Information Director

Janice M. Saragoni

Chief Counsel

Marilyn Newman

Director of Engineering &

Construction/Central Artery

William V. Twomey

Deputy Chief Engineer for Construction

William A. Billings

*Deputy Chief Engineer for Highway
Engineering*

Mario H. Tocchi

Deputy Chief Engineer for Maintenance

John F. Gallagher

Deputy Chief Engineer for District Operations

Robert J. McDonagh

District Highway Engineers

Ellsworth M. Sammet

District 1

Francis J. Hoey

District 2

Henry C. Holmes

District 3

Charles F. Mistretta

District 4

Arthur J. Doyle Jr.

District 5

Joseph T. Cronin

District 6

Robert A. Smith

District 7

Anthony G. Sandomato

District 8

*Massachusetts Department of Public Works
10 Park Plaza
Boston, MA 02116*

*Prepared by Crystal Gandrud, MDPW Deputy
Director Public Information*

*Graphic design supervision provided by Mary
Kean, MDPW Artist*

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